

REMARKS

Specification Amendments

On page 2, line 6 through line 20, Applicants have amended the specification to further clarify the prior art. No new matter has been added and Applicants' proposed amendments simply clarify the background of the invention.

Specification Rejections

In paragraph 1 of the Detailed Action, the Examiner objected to the following language from the specification as being unclear: "the impedance of the [lug bolt] and braided copper cable is about one ohm or less." The Examiner stated that it is unclear what length of the braided copper cable is needed for the impedance. The Applicants respectfully believe that the Examiner has misread the specification. Applicants' invention is designed to maintain the shortest length of cable. As is well-known in the art, impedance is directly related to length. Therefore, keeping the cable on a reel that maintains tension will maintain the shortest length i.e. the lowest possible impedance within the context of normal operations. The floating roof rises and falls with the level of liquid in the tank. Therefore, there is no fixed length (except tank depth) until the roof is on the bottom of the tank. As indicated in the specification, page 4 lines 11-26, it may be necessary to use multiple grounding systems in parallel with each other to reduce potential impedance. Since impedance varies with the length of the cable and with the floating nature of the tank roofs, not only is the cable length variable but the value of the low impedance cannot be fixed. One objective of the Applicants' invention is to ensure the minimal possible impedance for lightning related frequencies within the limitations of tank height. Applicants' invention minimizes impedance, among other ways, by maintaining the shortest length of cable. For example, in one embodiment, Applicants further minimize impedance by using bare copper wire. When the wire is retracted on a reel, the windings are shorted together again to minimize the effective tank wall to roof impedance.

Claim rejections 35 USC §112

In paragraph 2 of the Detailed Action, the Examiner set forth his reasoning for rejecting Applicants' claims. The Detailed Action states that Applicants' claims 1-28 are rejected under

35 USC §112, second paragraph as being indefinite for failing to point out and distinctly claim the subject matter which applicants regard as the invention. While paragraph 2 of the Detailed Action rejects claims 1-28 under 35 USC §112, the Examiner only referenced claims independent claims 1, 8, 12 and 18. In the various claims, the Examiner has objected to the term “low impedance.” The Examiner has stated that low impedance is confusing because it is not clear what the value of the low impedance is as well as what length of the wire is needed for the low impedance.

As suggested above, Applicants respectfully believe that the Examiner has misread the specification and claims. Applicants’ invention is designed to maintain the shortest length of cable. Due to the nature of the floating roofs involved with these tanks, i.e. the roof rises and falls with the level of liquid in the tank, there is no fixed length of cable (except tank depth) until the roof is on the bottom of the tank. It is well known in the art that impedance is related to length. The shorter the length of the cable, the lower the impedance. Therefore, keeping the cable on a reel that maintains tension will maintain the shortest length i.e. the lowest possible impedance within the context of normal operations. Since impedance varies with the length of the cable and with the floating nature of the tank roofs, not only is the cable length variable but the value of the low impedance cannot be fixed. However, as indicated in the specification and claims, using Applicants’ preferred embodiment, the impedance of the lug bolt and braided copper wire is about one ohm or less. The impedance of the whole system is about five ohms or less. See page 6 line 24 to page 7 line 2 and claims 7, 11, 16, 24, 29 and 30.

One objective of the Applicants’ invention is to minimize impedance or create the lowest impedance possible for lightning related frequencies within the limitations of tank height. Applicants’ invention minimizes impedance, among other ways, by maintaining the shortest length of cable. In the prior art, the lowest impedance obtained was between approximately 150-500 ohms. Applicants’ detailed description of the components allows an electrical engineer to calculate the bare braided copper cable (480/30 flat) impedance, wherein even for the entire height of a large oil storage tank (approximately 45-90 feet) the “low impedance” would be proportional to the height of the tank and inversely proportional to the width of the wire braid.

The Examiner has also stated that “low impedance is confusing because it is not clear [whether] a low impedance is based on high frequency or low frequency.” Respectfully, Applicants argue that it is well known to one skilled in the art of lightning strikes that the

frequency is that spectrum from 500 hertz to 1.5 megahertz with the major component between 500 kilohertz and 1 megahertz; that is included in a lightning discharge. Impedance is based on a spectrum of lightning based frequencies, but one skilled in the art would know that one megahertz is used for impedance assessment. Yet another reason that impedance cannot be a fixed value is because of the lognormal distribution of lightning frequencies. Applicants have amended claims 1, 8, 12 and 18 to indicate that the impedance is based on lightning based frequencies. Therefore, all of Applicants claims should now be allowable.

Claim rejections 35 USC §103

In paragraph 3 of the Detailed Action, the Examiner set forth his reasoning for rejecting Applicants' claims. The Examiner's §103 rejections are based on: Nelson in view of Claassen *et al.*

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must *both* be found in the prior art, not in applicant's disclosure. In this case, Applicants argue that the Examiner has not met the criteria for a finding of obviousness because nowhere in the cited art is there a suggestion to combine the teaching(s) to arrive at the claimed invention nor is there any reasonable expectation of success.

It is well known that most inventions are composed of elements that *per se* are old and well known. That, however, does not make an invention "obvious" under 35 U.S.C. 103. The Examiner's attention is respectfully drawn to, for example, *Orthopedic Equip. Co. v. United States*, 702 F.2d 1005, 1012, 217 USPQ 193, 199 (Fed.Cir.1983), where the Federal Circuit held that "[o]bviousness cannot be established by combining teachings of prior art to produce the claimed combination, absent some teaching or suggestion supporting combination." Under section 103, teachings of references can be combined *only* if there is some suggestion or incentive to do so. *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (C.C.P.A. 1976).

Also, as stated in *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F2d 1540, 1552 (Fed. Cir. 1983), *cert. denied*, *Garlock, Inc. v. W.L. Gore & Assoc.*, 469 U.S. 851, 105 S. Ct. 172, 83 L.Ed.2d 107 (1984):

To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.

Finally, even if the constituents of an invention may be old, if the result would not have been obvious at the time of invention, then the result may be patentable. *Reiner v. I. Leon Co.*, 285 F.2d 501, 128 USPQ 25, (2d.Cir. 1960), *cert. denied*, *I. Leon Co. v. Reiner*, 366 U.S. 978, 81 S. Ct., 1918, 6 L.Ed.2d 1268 (1961).

In each and every case, a patent examiner must apply the standard of patentability enunciated in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). In order to determine the basis for the rejection, the Examiner must:

- (A) Determine the scope and contents of the prior art;
- (B) Ascertain the differences between the prior art and the claims in issue;
- (C) Resolve the level of ordinary skill in the pertinent art; and
- (D) Evaluate evidence of secondary considerations.

Furthermore, when applying 35 U.S.C. 103, the following tenets of patent law must be adhered to:

- 1) The claimed invention must be considered as a whole;
- 2) The references must be considered as a whole and must suggest the desirability and the obviousness of making the combination;
- 3) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and
- 4) Reasonable expectation of success is the standard with which obviousness is determined.

The Examiner has not evaluated evidence of secondary considerations. Secondary considerations such as commercial success, unexpected results, long-felt need, failure of others, copying, licensing, and skepticism of experts will need to be considered by the Examiner before making a final §103 rejection for obviousness.

Applicants hereby submit the Declaration of Roy B. Carpenter, Jr., Chief Executive Officer of Lightning Eliminators & Consultants, Inc. ("LEC") and co-inventor of the claimed invention. In Mr. Carpenter's Declaration, he states that LEC's *Retractable Grounding AssembliesTM*, which are sold to companies such as Shell Oil, Mobile Oil Inc. etc., directly correspond to the invention claimed in the referenced patent application.

As indicated in Mr. Carpenter's Declaration, LEC's *Retractable Grounding AssembliesTM* have fulfilled a long-felt need in the oil storage industry. There is objective evidence that an art recognized problem has existed in the oil storage industry for a long period of time without solution. Those of ordinary skill in the art have recognized that shunts provide inadequate contact to prevent arcing and sparking. This long-felt need has not been satisfied by anyone else in the industry, despite constant attempts to do so. Applicants' invention satisfies this long-felt need.

Regarding the Examiner's comments regarding claims 4, 9, 15 and 21, Applicants respectfully disagree that it is an obvious matter of design choice to use a wire that further comprises a bare braided copper cable, flat braided copper cable and/or a braided conductor. As indicated in Applicants' specification, one of the objectives of Applicants' invention is to obtain low impedance at lightning related frequencies within the limitations of tank height. The copper braid has an impedance of about one ohm, which is considerably lower than what has been achieved in the prior art with shunts and other wire assemblies. See specification, page 3 lines 8-9, page 5 line 27 to page 6 lines 1-2, and page 6 line 24 to page 7 lines 1-2. Applicants respectfully argue that using a bare braided copper cable is for a particular purpose, i.e. to lower the overall impedance, and that Applicants' invention would not perform equally well if designed with Nelson's cable.

Regarding the Examiner's comments regarding claims 25, 26, 27 and 28, Applicants respectfully disagree that it would have been obvious at the time the invention was made to provide any number of reels and/or low impedance conductors. As indicated in Applicants' specification, floating roof tanks have large diameter that can accumulate a very large body of charge in the center of the tank. Charge stored is a function of tank diameter. Therefore, the larger the tank diameter, the larger the product stored and the larger the charge is stored in that

product. To ensure that the path is not too long, more than one reel and/or low impedance conductor may be necessary. See specification, page 4 lines 11-16. Duplication of the reels and/or low impedance conductors is necessary to ensure that there is low impedance all around the protected fluid and that a positive connection always exists to eliminate the risk of a bound charge. Applicants argue that this is not a mere duplication of the essential working parts of the device that involves only routine skill in the art.

Applicants have noted the Examiners comments at paragraphs 4 and 5 of the Detailed Action.

In view of the above, the Applicant respectfully requests the Examiner to pass this application to allowance.

Respectfully Submitted,



Date: 22/05

Rick Martin, Reg. No. 32,267
Patent Law Offices of Rick Martin, P.C.
416 Coffman Street
Longmont, CO 80501
(303) 651-2177